UNIVERSITY OF JOHANNESBURG
FACULTY OF EDUCATION
NOVEMBER / DECEMBER
SUPPLEMENTARY EXAMINATION 2014

PROGRAMME: B Ed (FET) and PGCE
MODULE: SUBJECT METHODOLOGY: MATHEMATICS
CODE: XWI000 AND XWI0001
TIME: 3 hours
MARKS: 200
EXAMINER: Dr ED Spangenberg
Prof G Jacobs
MODERATOR: Dr S van Putten (UP)
(This paper consists of 6 pages)

INSTRUCTIONS

Read the following instructions carefully before answering the questions:

1. This question paper consists of 10 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Write legibly and present your work neatly.
5. Read the questions carefully before answering them.
6. Questions may be answered in English or Afrikaans.

QUESTION 1

1.1 An agreement was reached in the ELRC (Resolution 8 of 2003) to integrate the existing programmes on quality management in education. Use the following headings to discuss the Integrated Quality Management System (IQMS).

1.1.1 What is the IQMS? (6)

1.1.2 The purpose of IQMS. (5)

1.2 Bertrand Russel (1915) argued that, “Mathematics may be defined as the subject in which we never know what we are talking about, or whether what we are saying is true”.

1.2.1 What in your opinion is the nature of Mathematics? (5)

1.2.2 What implications does the nature of Mathematics have on your teaching of Mathematics? (5)

1.3 Discuss the cognitive processes involved in doing Mathematics. (12)

(33)

QUESTION 2

2.1 Discuss the various phases in conducting a Mathematics lesson. (12)

2.2 Specific outcomes should be written for three domains.

2.2.1 Mention the domains. (3)

2.2.2 Write a specific outcome on the topic “fractions” for each of these domains. (3)

(18)

QUESTION 3

3.1 Explain what a curriculum rationale is. (3)

3.2 Discuss the three models demonstrating the connection between curriculum and instruction. (12)

3.3 Which model do you perceive as the best and why? (5)

(20)

QUESTION 4

4.1 Explain the difference between the heuristic strategy and ostensive strategy and give an example in Mathematics of each. (4)

4.2 Mention the five basic elements of co-operative learning in the Mathematics classroom. (5)

4.3 Use Polya’s four steps for problem solving to solve the following problem:
The length of a rectangular prism is eight times its height. The width is four times the height. The length of the diagonal between two opposite vertices is

36cm. Find the volume of the prism. Clearly indicate the questions to be asked in each step. (20)

(29)

QUESTION 5

The following questions appeared in a Gr 10 Algebra examination paper. You are expected to draft an appropriate **answer** (memorandum) for each question. Indicate the *number of marks* that you will allocate to each question, as well as for what each mark will be awarded (for marking purposes).

5.1 Factorise the following algebraic expressions.

(a) $9x^2 + 3x - 2$

(b) $\frac{y^2}{2} - \frac{13y}{2} + 18$

5.2 Solve for x and y if it is given that: $x + y = -3$ and $4x + 3y = -8$

5.3 Simplify each of the following without using a calculator:

(a) $7^7 . 7^3 . 49^{-5}$

(b) $\frac{3}{2x} + \frac{1}{6x} - \frac{1}{x}$ $(x \neq 0)$

5.4 Solve for x, if $x \in \mathrm{R}$: $2(x - 3) + 4 > 3(x - 1)$

5.5 Write your answer in 5.4 in interval notation.

QUESTION 6

A Gr 10-learner has attempted the five problems in the previous question. His suggested answers are portrayed below and in *Annexure A* (at the back of the exam paper). You are expected to mark his answers, in accordance with your memoranda for Question 5. Clearly indicate in **Annexure A** for what each individual mark is allocated and eventually also how many marks he will be awarded for each of his answers. Your completed Annexure A needs to be **returned** with your examination answer sheet.

Combined marks for Questions 5 and 6: (40)

QUESTION 7

The main purpose of school-based assessment is to continuously fulfil five types of assessment, namely *baseline*, *informal*, *diagnostic*, *formal* and *systemic* assessment. Distinguish these five types of assessment from each other and also describe the **desirable implementation** of each of them in the subject Mathematics.

(15)

QUESTION 8

8.1 Explain what the assessment tasks **recording** and **reporting** are and suggest guidelines on *why* and *how* they should be performed in Mathematics. (10)

8.2 Highlight five school-based **principles** of recording and reporting. (5)

(15)

QUESTION 9

Distinguish between an assessment **method**, **tool** and **form** by firstly *defining* each of them and secondly by providing *four examples* of each of them in Mathematics.

(15)

QUESTION 10

Discuss the requirements of a good test or examination paper in Mathematics. **(15)**

TOTAL: 200

Annexure A can be found on the next page.

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ANNEXURE A

Your initials and surname: _____ **Student number:** _____

This Annexure should be used to answer **Question 6**.
Your completed Annexure must be returned with your answer sheet.

6.1 (a) The learner's suggested answer to **Question 5.1 (a)**

$$9x^2 + 3x - 2$$

$$= (3x + 2)(3x - 1)$$

6.1 (b) The learner's suggested answer to **Question 5.1 (b)**

$$\frac{y^2}{2} - \frac{13y}{2} + 18$$

$$= \frac{y^2}{2} \times \frac{2}{1} - \frac{13y}{2} \times \frac{2}{1} + 18 \times \frac{2}{1}$$

$$= \frac{1}{2}(y^2 - 13y + 36)$$

$$= (y - 4)(y - 9)$$

6.2 The learner's suggested answer to **Question 5.2**

$x + y = -3$ and $4x + 3y = -8$

$x + y = -3$

$x = -3 - y$

$x = -y - 3$ ①

$4x + 3y = -8$

$4x = -3y - 8$

$x = \frac{-3}{4}y - 2$ ②

Subtract EQ_2 from EQ_1

$x + y = -3$

$x = +\frac{-3}{4}y - 2$

$0 = \frac{1}{4}y - 1$

$\frac{1}{4}y = -1$

$y = 4$ ③

Sub y = 4 into EQ_1

$x = -y\ -3$

$x = -(4) - 3$

$= -4 - 3$

$= -7$

$\boldsymbol{x\ = -7}$ **and** $\boldsymbol{y = 4}$

6.3 (a) The learner's suggested answer to **Question 5.3 (a)**

$7^7 . 7^3\ . 49^{-5}$

$= \frac{7^5 . 7^3}{49^5}$

$= \frac{282475249}{282475249}$

$= 1$

6.3 (b) The learner's suggested answer to **Question 5.3 (b)**

$\frac{3}{2x} + \frac{1}{6x} - \frac{1}{x}$

$= \frac{9x + 1 - 6x}{6x}$

$= \frac{3x + 1}{6x}$

6.4 The learner's suggested answer to **Question 5.4**

$2(x - 3) + 4 > 3(x - 1)$

$2x - 6 + 4 > 3x - 1$

$2x - 3x < +6 - 4 - 1$

$-x < 1$

$x > -1$

6.5 The learner's suggested answer to **Question 5.5**

$\{x\ /\ x > 1; x \in R\}$